ABSTRACT

The subject invention is a gas filter correlation camera and related methods. It is based on a novel combination of two techniques: the use of gas filter correlation radiometry in combination with an infrared camera. The camera comprises a rotatable filter wheel and an infrared camera. The filter wheel is provided with a plurality of chambers, each being filled with a different gas. Each gas corresponds to a gas of interest in the gas volume under study, usually the atmosphere. The camera can be used to produce three dimensional soundings of gas distributions by combining multi-angle viewing with tomographic, or related, reconstruction and retrieval techniques.

Infrared light emitted by the gas volume under study is passed through each of the chambers as the filter wheel rotates, selectively filtering the light in a manner consistent with the infrared radiation absorption characteristics of the various gases. By correlating the position of the filter wheel with the receipt by the infrared camera (and related data-processing equipment) of filtered infrared radiation from the filter wheel, and by analyzing that light for each gas in the filter wheel, the temperature, concentration and other information for each of the corresponding gases in the gas volume under study may be obtained.